

Exercises! Decay Engine

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1. At $t=0$ there are 10 Ci of Sr-90. What will be the activity of Y-90 after 5 years? Ans. 8.87 Ci
2. What is the time required for the activity of Na-24 to diminish to 1% of its initial value? Ans. 4.13 d
3. What initial mass of F-18 is required in order that there are 3 mg remaining after 16 hours?(1.3g)
4. Question from the Forum (see next page)

4. Question from the Forum...

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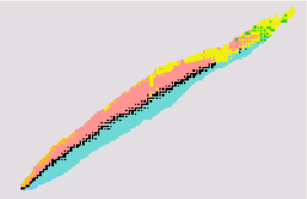
Qu. U-237 is a daughter nuclide of Pu-241 and it has a branching ratio of $2.46\text{E-}5$. But this daughter nuclide has no appearance in the decay engine calculation of Pu-241 or I don't find it. Is there something missing or what should I do? Thank you in advance! (Anika)

Ans. The Decay Engine in Nucleonica is based on the Bateman solution for radioactive decay. This is a mathematically exact solution to the differential equations so in principle all decay products (no matter how small the branching ratio) should be calculated. For the decay of Pu-241, the standard settings in the Decay Engine for the accuracy factor is $1\text{E-}2$. This means that daughter products with a branching ratio BR less than $1\text{E-}2$ are ignored in the calculation. For most cases this is satisfactory. But in your case, you are interested in U-237 which has a BR of $2.46\text{E-}5$. Since this BR is less than the default $1\text{E-}2$ it is not included in the calculation. To see the U-237 daughter you must enter an accuracy factor less than the BR e.g. $1\text{E-}5$. You will then see the daughter U-237. In addition, if you set the accuracy factor to 0, then all daughters are included in the calculation (the results then show 23 linear chains).


... web driven nuclear science

Applications My Preferences Help


Nuclide Explorer



» Actual Chart: Karlsruhe

Search Nucleonica Documentation

Nuclear Data Retrieval



Application Centre

- » Mass Activity Calculator
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Welcome, Joe

Edit Preferences Administration

MyCommunity Portal

My Last Nuclides

- 90 Th232
- 90 Th231
- 94 Pu239
- 92 U235
- 25 Mn52

My Nuclide Mixtures

- Pu238+daughter (100g @50y)
- Natural Uranium
- Cs137 + Ba137m
- U232+Co60
- Transuranics in 1 ton Spent Fuel (4.2% enriched, 50GWd/t, 6 years cooling)

My Sources

- Pu239 1 g
- natu

My Messages

- Thanks!
- About my group and information
- Photo Change
- Open call for JRC Traineeships at the Institute for Transuranium Elements
- NAMLS-9 International Conference on Nuclear Analytical Methods in the Life Sciences

» View


User Alerts

- Task completed (DecayEngine: Uranium 238)

» View

Decay Engine:

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ApplicationsMy PreferencesPrintHelp

Co60

10.47 m5.27 y

Decay Engine

27 Cobalt

Current Chart: Karlsruhe

Element: Mass:

Co60

Nuclide Mixtures Selector

Decay EngineOptions

Quantity:Grams1

Accuracy Factor:1E-02

Time:Years5.26E+01

Number of timesteps:10

Number of chains:

StartStart in backgroundReset

Type of graph:Numbers

DECAY ENGINE

